We claim:

1. A piezoelectric fuel injection system for an internal combustion engine, said piezoelectric fuel injection system being adapted to allow injection of fuel during an injection event, said piezoelectric fuel injection system comprising:

a piezoelectric element actuable to inject fuel during said injection event;

a power source adapted to provide power to said piezoelectric element; and

a controller adapted to switch said power source on to begin said injection event, and to cycle said power source a plurality of times during at least a portion of said injection event, each cycle including switching said power source off, and switching said power source back on to thereby provide cyclical power to said piezoelectric element during said portion of said injection event to control the rate of injected fuel during said portion of said injection event.

2. The system of claim 1, wherein rate of injected fuel during said portion of said injection event is one of gradually increased and gradually decreased as a result of said cycling of said power source.

3. The system of claim 1, wherein said controller is further adapted to terminate cycling of said power source.

4. The system of claim 3, wherein said controller is adapted to terminate cycling of said power source with said power source switched back on so as to provide constant power to said piezoelectric element for a duration so that rate of injected fuel is substantially constant for said duration.

5. The system of claim 1, wherein said portion of said injection event during which said power source is cycled plurality of times by said controller is at an early stage of said injection event.

6. The system of claim 1, wherein said controller is further adapted to switch said power source off and back on in less than 500 micro-seconds so that at least one cycle is attained in less than 500 micro-seconds.

7. The system of claim 1, further comprising a nozzle valve element having a response time, wherein said controller is adapted to switch said power source off and back on at a rate that is faster than said response time of said nozzle valve element.

8. A piezoelectric fuel injection system for an internal combustion engine, said piezoelectric fuel injection system being adapted inject fuel during an injection event of a combustion cycle, said piezoelectric fuel injection system comprising:

a piezoelectric fuel injector actuable to inject fuel during said injection event, said piezoelectric fuel injector having a piezoelectric element;

a power source adapted to provide power to said piezoelectric element to actuate said piezoelectric fuel injector; and

a controller adapted to cyclically modulate power provided to said piezoelectric element by said power source during at least a portion of said injection event, said controller cyclically modulating said power between a predetermined first voltage and a predetermined second voltage that is less than said first voltage to control the rate of fuel injected by said piezoelectric fuel injector during said portion of said injection event.

9. The system of claim 8, wherein rate of injected fuel during said portion of said injection event is one of gradually increased and gradually decreased as a result of said cyclic modulation of said power.

10. The system of claim 8, wherein said predetermined second voltage is approximately zero volts.

11. The system of claim 8, wherein said controller is further adapted to terminate cyclic modulation of said voltage.

12. The system of claim 11, wherein said controller is adapted to terminate cyclic modulation of said voltage at said predetermined first voltage to provide continued power to said piezoelectric element at said predetermined first voltage so that said piezoelectric fuel injector injects fuel at a substantially constant rate.

13. The system of claim 8, wherein said portion of said injection event during which said controller cyclically modulates said voltage to said piezoelectric element is at an early stage of said injection event.

14. The system of claim 8, wherein said controller is further adapted to modulate power between said predetermined first voltage and said predetermined second voltage in less than 500 micro-seconds.

15. The system of claim 8, further comprising a nozzle valve element having a response time, wherein said controller is adapted to switch said power source off and back on at a rate that is faster than said response time of said nozzle valve element.

16. A method of controlling a piezoelectric fuel injection system for an internal combustion engine having a piezoelectric fuel injector adapted to inject fuel during an injection event of a combustion cycle, said method comprising the steps of:

providing a voltage to said piezoelectric fuel injector to begin said injection event;

terminating said voltage to said piezoelectric fuel injector;

again providing said voltage to said piezoelectric fuel injector; and

repeatedly terminating and providing said voltage to said piezoelectric fuel injector during at least a portion of said injection event to control rate of fuel injected by said piezoelectric fuel injector during said portion of said injection event.

17. The method of claim 16, wherein rate of injected fuel during said portion of said injection event is one of gradually increased and gradually decreased as a result of repeatedly terminating and providing said voltage to said piezoelectric fuel injector.

18. The method of claim 16, further including the step of continuously providing said voltage to said piezoelectric fuel injector during said injection event after said step of repeatedly terminating and providing said voltage to said piezoelectric fuel injector so that said piezoelectric fuel injector injects fuel at a substantially constant rate.

19. The method of claim 16, wherein said portion of said injection event during which said step of repeatedly terminating and providing said voltage to said piezoelectric fuel injector is at an early stage of said injection event.

20. The method of claim 16, wherein said step of repeatedly terminating and providing said voltage to said piezoelectric fuel injector includes the step of terminating said voltage within less than 500 micro-seconds of providing said voltage.

21. The method of claim 16, wherein said piezoelectric fuel injector includes a nozzle valve element having a response time, and said step of repeatedly terminating and providing said voltage to said piezoelectric fuel injector is attained at a rate that is faster than said response time of said nozzle valve element.

22. A method of controlling a piezoelectric fuel injection system for an internal combustion engine having a piezoelectric fuel injector during an injection event of a combustion cycle, said method comprising the steps of:

providing a voltage to said piezoelectric fuel injector; and

cyclically modulating said voltage that is provided to said piezoelectric fuel injector between a predetermined first voltage and a predetermined second voltage during at least a portion of said injection event to thereby control rate of fuel injected by said piezoelectric fuel injector during said portion of said injection event.

23. The system of claim 22, wherein rate of injected fuel during said portion of said injection event is one of gradually increased and gradually decreased as a result of said step of cyclically modulating said voltage.

24. The method of claim 23, wherein said predetermined second voltage is less than said predetermined first voltage.

25. The method of claim 24, wherein said predetermined second voltage is substantially zero volts.

26. The method of claim 23, further including the step of terminating said step of cyclically modulating said voltage.

27. The method of claim 26, further including the step of continually providing said predetermined first voltage to said piezoelectric fuel injector after terminating said step of cyclically modulating said voltage so that rate of fuel injected by said piezoelectric fuel injector is substantially constant.

28. The method of claim 22, wherein said portion of said injection event during which said step of modulating said voltage provided to said piezoelectric fuel injector is at an early stage of said injection event.

29. The method of claim 22, wherein at least one cycle in said step of cyclically modulating said voltage provided to said piezoelectric fuel injector is attained in less than 500 micro-seconds.

30. The method of claim 22, wherein said piezoelectric fuel injector includes a nozzle valve element having a response time, and said step of repeatedly terminating and providing said voltage to said piezoelectric fuel injector is attained at a rate that is faster than said response time of said nozzle valve element.

31. A piezoelectric fuel injection system for an internal combustion engine, said piezoelectric fuel injection system comprising:

a fuel injector actuable to inject fuel during an injection event, said fuel injector having a piezoelectric element; and

a controller adapted to operate said fuel injector in:

a cycling stage in which power provided to said piezoelectric element during at least a portion of said injection event is repeatedly switched between a predetermined first voltage and a predetermined second voltage less than said first voltage to control the rate of fuel injected by said fuel injector; and

a steady state stage in which power provided to said piezoelectric element is substantially steady at said predetermined first voltage so that rate of fuel injected by said fuel injector is substantially constant.

32. The system of claim 31, wherein rate of injected fuel during said portion of said injection event is one of gradually increased and gradually decreased during said cycling stage.

33. The system of claim 31, wherein said predetermined second voltage is approximately zero volts.

34. The system of claim 31, wherein said controller is further adapted to switch power to said piezoelectric element between said predetermined first voltage and said predetermined second voltage in said cycling stage in less than 500 micro-seconds.

35. The system of claim 31, wherein said controller operates said fuel injector in said cycling stage before said steady state stage.